

## Anex

## Seasonic SSR-1000TR Ultra

Lab ID#: 275

Receipt Date: -

Test Date: -

Report:

Report Date: Jan 16, 2018

DUT INFORMATION	
Brand	Seasonic
Manufacturer (OEM)	Seasonic
Series	Prime Titanium Ultra
Model Number	SSR-1000TR Ultra
Serial Number	R1710AA190460025
DUT Notes	

DUT SPECIFICATIONS	
Rated Voltage (Vrms)	100-240
Rated Current (Arms)	13-6.5
Rated Frequency (Hz)	50-60
Rated Power (W)	1000
Type	ATX12V
Cooling	135mm Fluid Dynamic Bearing Fan (HA13525L12F-Z)
Semi-Passive Operation	✓ (selectable)
Cable Design	Fully Modular

POWER SPECIFICATIONS						
Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	25	25	100	3	0.3
	Watts	125		996	15	3.6
Total Max. Power (W)		1000				

CABLES AND CONNECTORS				
Modular Cables				
Description	Cable Count	Connector Count (Total)	Gauge	In Cable Capacitors
ATX connector 20+4 pin (600mm)	1	1	18-22AWG	No
4+4 pin EPS12V (660mm)	2	2	18AWG	No
6+2 pin PCIe (670mm+80mm)	2	4	18AWG	No
6+2 pin PCIe (760mm)	4	4	18AWG	No
SATA (350mm+150mm+150mm+150mm)	1	4	18AWG	No
SATA (410mm+110mm+110mm+110mm)	2	8	18AWG	No
SATA (300mm+150mm)	1	2	18AWG	No
4 pin Molex (450mm+120mm+120mm)	1	3	18AWG	No
4 pin Molex (350mm+120mm)	1	2	18AWG	No
4 pin Molex Adapter / SATA (150mm+150mm)	1	2	18AWG	No
FDD Adapter (+100mm)	1	1	22AWG	No
AC Power Cord (1370mm) - C13 coupler	1	1	18AWG	-

> The link to the original test results document should be provided in any case

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## Seasonic SSR-1000TR Ultra

General Data	
Manufacturer (OEM)	Seasonic
Platform Model	Prime Titanium
Primary Side	
Transient Filter	4x Y caps, 3x X caps, 2x CM chokes, 1x MOV
Inrush Protection	NTC Thermistor & Relay
Bridge Rectifier(s)	2x Vishay LVB2560 (600V, 25A @ 105°C)
APFC MOSFETS	2x Infineon IPP60C7099 (650V, 14A @ 100°C, 0.099 Ohm)
APFC Boost Diode	1x STPSC10H065D (600V, 10A @ 135°C)
Hold-up Cap(s)	1x Hitachi (400V, 470uF, 2000h @ 105°C, HU) 1x Hitachi (400V, 820uF, 2000h @ 105°C, HU)
Main Switchers	4x Infineon IPP50R140CP (550V, 15A @ 100°C, 0.14 Ohm)
Drivers For Main Switchers	2x Silicon Labs Si8230BD
APFC Controller	ON Semiconductor NPC1654
Switching Controller	Champion CM6901
Topology	Primary side: Full-Bridge & LLC Resonant Converter Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	
+12V MOSFETS	6x R638
5V & 3.3V	DC-DC Converters: 6x Infineon BSC0906NS PWM Controller: APW7159
Filtering Capacitors	Electrolytics: Nippon Chemi-Con (1-5,000h @ 105°C, KZE), Nippon Chemi-Con (105°C, W), Nippon Chemi-Con (4,000-10,000h @ 105°C, KY), Chemi-Con (5-6,000h @ 105°C, KZH), Rubycon (3-6,000h @ 105°C, YXG) Polymers: FPCAP, Nippon Chemi-Con
Supervisor IC	Weltrend WT7527V (OVP, UVP, OCP, SCP, PG ) & AS393M
Fan Model	Hong Hua HA13525M12F-Z (135mm, 12V, 0.36A, 1800 RPM, Fluid Dynamic Bearing)
5VSB Circuit	
Buck Converter	Leadtrend LD7750R
Rectifiers	STMicroelectronics STU6N65K3 (650V, 3A @ 100°C, 1.3Ohm) Infineon BSC0906NS (30V, 40A @ 100°C, 4.5 mOhm)
-12V Circuit	
Buck Converter	Lite-On LSP5523 (3A max output current )

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## Seasonic SSR-1000TR Ultra

RESULTS		
Temperature Range (°C /°F)		30-32 / 86-89.6
Average Efficiency		91.703
Efficiency With 10W (≤500W) or 2% (>500W) Load -115V		0.000
Average Efficiency 5VSB		79.825
Standby Power Consumption (W) -115V		0.0548672
Standby Power Consumption (W) -230V		0.0830985
Average PF		0.992
ErP Lot 3/6 Ready		✓
(EU) No 617/2013 Compliance		✓
Avg Noise Output		12.08
Efficiency Rating (ETA)		TITANIUM
Noise Rating (LAMBDA)		A++

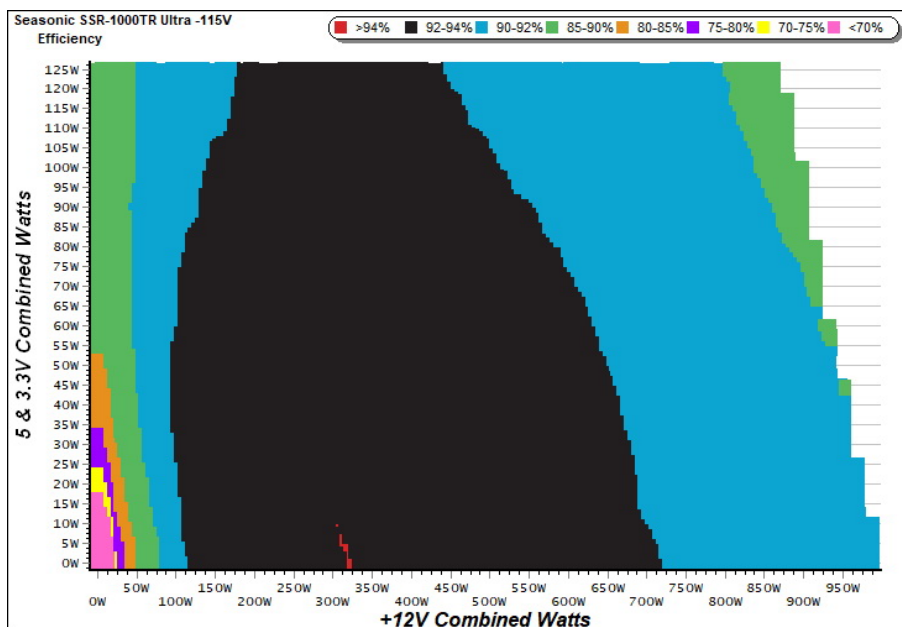
TEST EQUIPMENT		
Electronic Loads	Chroma 6314A x2 63123A x6 63102A 63101A	Chroma 63601-5 x2 Chroma 63600-2 63640-80-80 x10 63610-80-20
AC Sources	Chroma 6530, Chroma 61604	
Power Analyzers	N4L PPA1530, N4L PPA5530	
Oscilloscopes	Picoscope 4444 & 3424, Keysight DSOX3024A, Rigol DS2072A	
Voltmeter	Keithley 2015 THD 6.5 Digit	
Sound Analyzer	Bruel & Kjaer 2250-L G4	
Microphone	Bruel & Kjaer Type 4955-A, Bruel & Kjaer Type 4189	
Data Loggers	Picoscope TC-08 x2, Labjack U3-HV x2	

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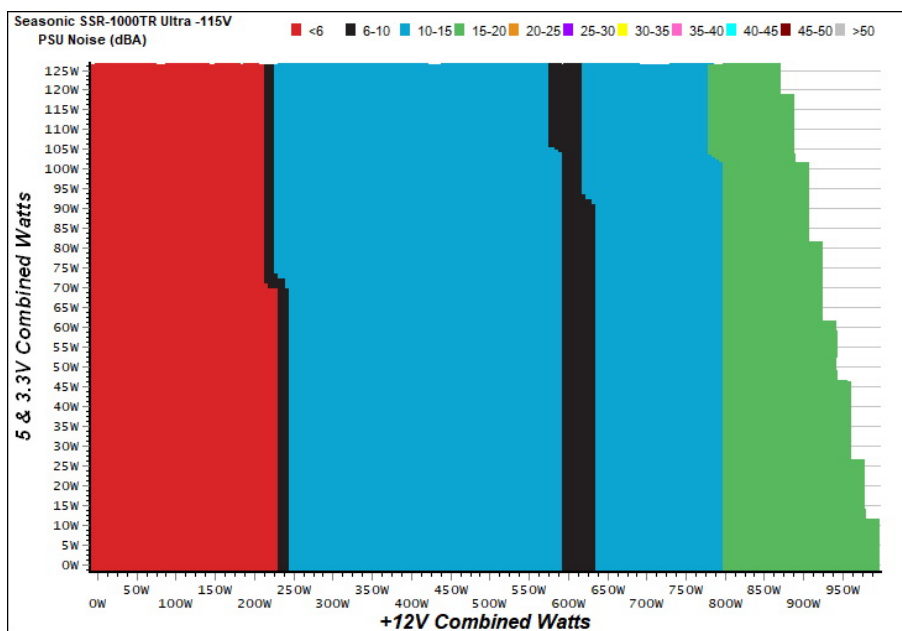
### EFFICIENCY GRAPH



#### INFO

This graph depicts the PSU's efficiency throughout its entire operational range. For the generation of the efficiency and noise graphs we set our loaders to auto mode through our custom-made software before trying thousands of possible load combinations

### NOISE GRAPH



#### INFO

The PSU's noise in its entire operational range and under 30-32 °C ambient is depicted in this graph. The X axis represents the load on the +12V rail(s) while the Y axis is the load on the minor rails

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## Anex

## Seasonic SSR-1000TR Ultra

### 5VSB EFFICIENCY -115V (ERP LOT 3/6 & CEC)

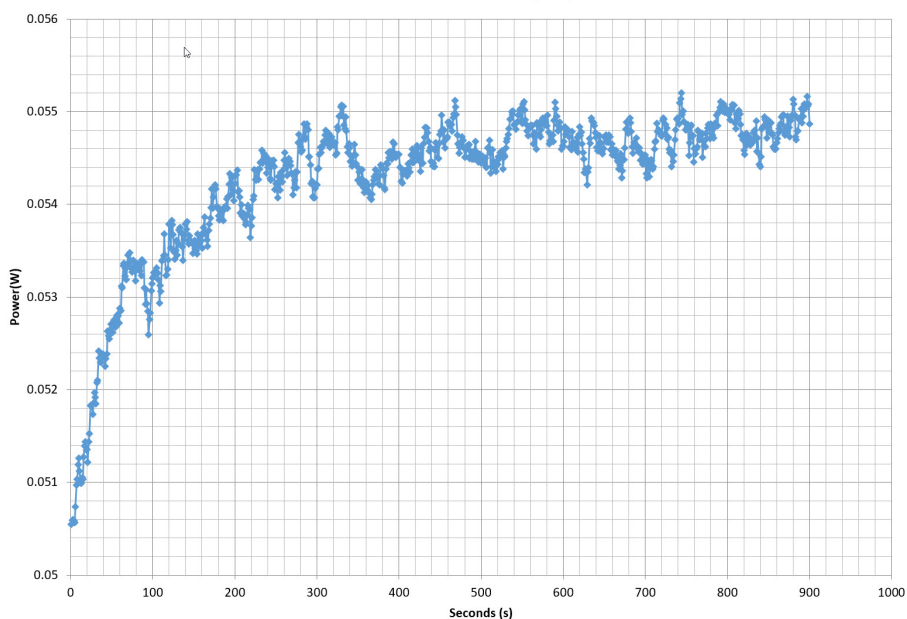
Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.042A	0.207	66.134%	0.034
	4.966V	0.313		115.02V
2	0.087A	0.433	73.639%	0.064
	4.963V	0.588		115.02V
3	0.543A	2.674	80.445%	0.269
	4.929V	3.324		115.01V
4	1.002A	4.908	80.485%	0.362
	4.897V	6.098		115.01V
5	1.502A	7.309	80.691%	0.414
	4.866V	9.058		115.01V
6	3.001A	14.355	79.410%	0.483
	4.783V	18.077		115.01V

### 5VSB EFFICIENCY -230V (ERP LOT 3/6 & CEC)

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.042A	0.207	57.821%	0.012
	4.966V	0.358		230.12V
2	0.087A	0.433	68.189%	0.021
	4.962V	0.635		230.12V
3	0.542A	2.667	79.093%	0.104
	4.917V	3.372		230.12V
4	1.002A	4.884	79.661%	0.174
	4.873V	6.131		230.12V
5	1.502A	7.257	80.037%	0.231
	4.832V	9.067		230.12V
6	3.001A	14.217	79.970%	0.332
	4.737V	17.778		230.13V

### VAMPIRE POWER -115V

Power - R1708TA105680169 - 15/01/2018 - 09:41



#### INFO

This graph is generated by the PPA Standby Power Analysis software which takes full control of the power analyzer during the whole procedure. This application features all of the EN50564 & IEC62301 test limits for standby power software testing

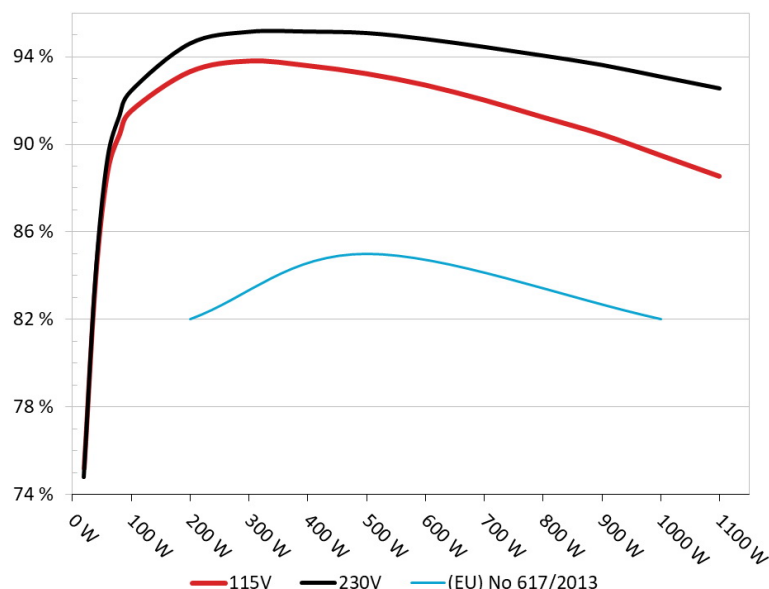
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### EFFICIENCY UNDER HIGH AMBIENT TEMPERATURE

**Efficiency: Seasonic SSR-1000TR Ultra**  
Ambient: 37°C - 47°C (98.6°F - 116.6°F)

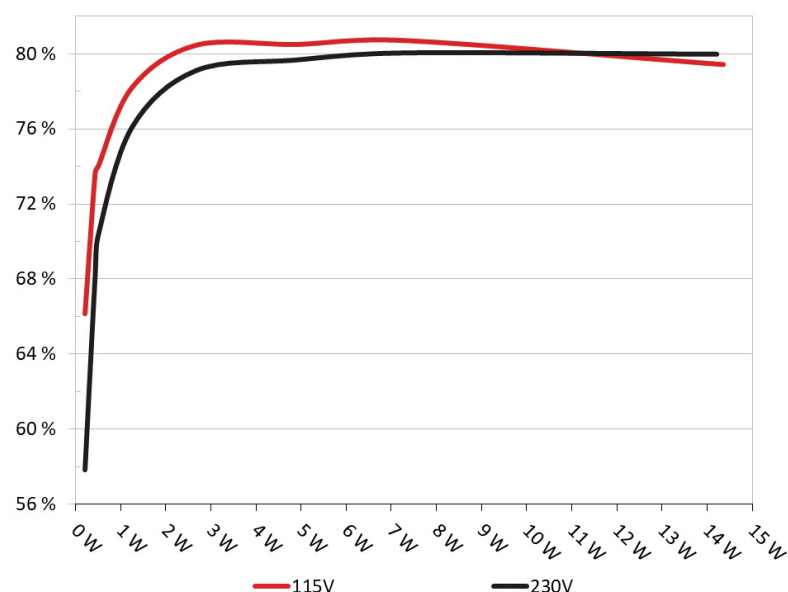


#### INFO

The PSU's efficiency under high ambient temperatures with 115V and 230V input. For this graph the results of the 10-110% load regulation table are used

### 5VSB EFFICIENCY

**5VSB Efficiency: Seasonic SSR-1000TR Ultra**  
Ambient: 34°C - 36°C (93.2°F - 96.8°F)



#### INFO

This graph depicts the efficiency levels of the 5VSB rail with 115V and 230V input

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## Seasonic SSR-1000TR Ultra

### 10-110% LOAD TESTS

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
1	6.364A	1.986A	1.988A	0.996A	99.795	91.522%	420	10.8	37.86°C	0.974
	12.292V	5.030V	3.315V	5.009V	109.039				44.06°C	115.08V
2	13.736A	2.981A	2.983A	1.196A	199.672	93.308%	420	10.8	38.21°C	0.988
	12.290V	5.028V	3.313V	5.004V	213.993				44.95°C	115.09V
3	21.468A	3.486A	3.500A	1.400A	299.897	93.791%	420	10.8	39.19°C	0.994
	12.288V	5.025V	3.311V	4.995V	319.751				46.15°C	115.09V
4	29.185A	3.984A	3.984A	1.601A	399.721	93.579%	435	10.7	39.86°C	0.995
	12.285V	5.023V	3.308V	4.992V	427.150				47.20°C	115.07V
5	36.570A	4.976A	4.985A	1.801A	499.610	93.213%	290	9.0	40.79°C	0.994
	12.282V	5.021V	3.308V	4.988V	535.990				48.35°C	115.07V
6	43.964A	5.975A	5.986A	2.006A	599.574	92.693%	385	10.5	41.19°C	0.995
	12.278V	5.020V	3.306V	4.985V	646.837				49.21°C	115.07V
7	51.359A	6.981A	6.987A	2.205A	699.544	92.010%	490	13.3	42.42°C	0.996
	12.275V	5.019V	3.305V	4.981V	760.289				50.62°C	115.07V
8	58.759A	7.974A	7.991A	2.411A	799.437	91.227%	590	17.4	43.73°C	0.997
	12.271V	5.018V	3.303V	4.976V	876.317				52.37°C	115.07V
9	66.585A	8.475A	8.512A	2.410A	899.414	90.446%	915	30.3	44.39°C	0.997
	12.267V	5.017V	3.302V	4.975V	994.421				53.60°C	115.08V
10	74.166A	8.978A	9.003A	3.021A	999.273	89.489%	1435	41.8	45.46°C	0.998
	12.264V	5.014V	3.299V	4.960V	1116.645				54.92°C	115.08V
11	82.317A	8.983A	9.003A	3.022A	1099.078	88.535%	1640	46.0	46.57°C	0.998
	12.262V	5.013V	3.298V	4.958V	1241.401				56.41°C	115.09V
CL1	0.099A	15.021A	15.005A	0.004A	126.578	88.333%	540	15.8	44.98°C	0.984
	12.284V	5.030V	3.318V	5.068V	143.296				48.83°C	115.10V
CL2	82.929A	1.002A	1.001A	1.002A	1030.295	89.420%	1495	42.6	46.74°C	0.998
	12.263V	5.017V	3.302V	4.994V	1152.195				53.41°C	115.08V

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## Seasonic SSR-1000TR Ultra

### 20-80W LOAD TESTS

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	PF/AC Volts
1	1.190A	0.491A	0.480A	0.196A	19.671	75.212%	0	<6.0	0.814
	12.287V	5.034V	3.318V	5.029V	26.154				115.06V
2	2.403A	0.990A	0.994A	0.395A	39.783	84.067%	0	<6.0	0.914
	12.286V	5.031V	3.316V	5.023V	47.323				115.07V
3	3.613A	1.485A	1.506A	0.595A	59.870	88.795%	0	<6.0	0.951
	12.294V	5.031V	3.316V	5.020V	67.425				115.07V
4	4.818A	1.984A	1.988A	0.796A	79.793	90.435%	0	<6.0	0.966
	12.293V	5.031V	3.316V	5.015V	88.232				115.08V

### RIPPLE MEASUREMENTS

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	13.2 mV	4.1 mV	7.0 mV	3.3 mV	Pass
20% Load	13.3 mV	4.3 mV	7.3 mV	3.5 mV	Pass
30% Load	8.7 mV	5.6 mV	9.7 mV	5.2 mV	Pass
40% Load	10.5 mV	5.2 mV	9.4 mV	6.3 mV	Pass
50% Load	11.5 mV	5.4 mV	10.0 mV	5.6 mV	Pass
60% Load	12.9 mV	5.5 mV	10.9 mV	6.3 mV	Pass
70% Load	13.7 mV	6.0 mV	10.4 mV	6.8 mV	Pass
80% Load	15.1 mV	5.9 mV	11.7 mV	8.0 mV	Pass
90% Load	15.9 mV	5.9 mV	11.8 mV	8.5 mV	Pass
100% Load	16.9 mV	6.8 mV	12.6 mV	9.5 mV	Pass
110% Load	18.3 mV	7.3 mV	13.6 mV	10.6 mV	Pass
Crossload 1	15.4 mV	5.1 mV	8.5 mV	4.4 mV	Pass
Crossload 2	17.1 mV	6.5 mV	12.2 mV	8.6 mV	Pass

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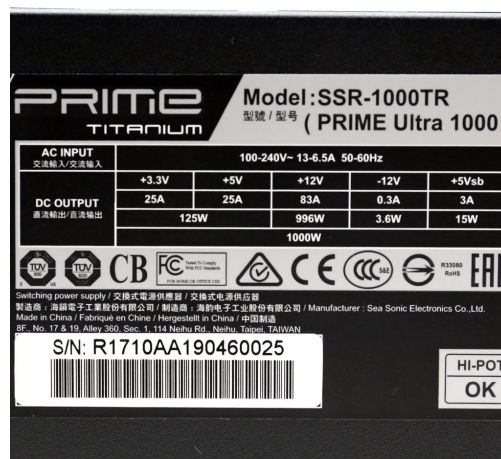
Seasonic SSR-1000TR Ultra

### HOLD-UP TIME & POWER OK SIGNAL (230V)

Hold-Up Time (ms)	28.86
AC Loss to PWR_OK Hold Up Time (ms)	24.20
PWR_OK Inactive to DC Loss Delay (ms)	4.66

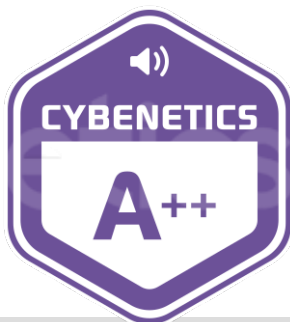


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Power specifications label

## CERTIFICATIONS



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